2.6

Zeros

When given the zeros of a polynomial function a polynomial function can be formed.

Ex.

Given $x = 7$, and $x = -2$, write a polynomial function in **factored form** with these zeros.

Solution: If x = 7, then x – 7 = 0 and if x = -2, then x + 2 = 0, so the factors are (x – 7) and (x + 2) which we use in the function:

$f(x) = (x - 7)(x + 2)$

To write the equation in **standard form**, **expand** (multiply the factors) of the polynomial function.

Ex.

$f(x) = (x - 7)(x + 2) = x^2 - 5x - 14$

So, the standard form of the polynomial function is: $f(x) = x^2 - 5x - 14$

Practice:

Find the polynomial function with the given zeros. Write the function in both factored form and standard form.

1. $x = -5$, $x = 2$, $x = 1$

2. $x = 2$, multiplicity 2, $x = -3$

<u>Simplifying Radical Numbers</u>

Ex. Simplify

1. $\sqrt{24}$
2. $\sqrt{-24}$
3. $2\sqrt{120}$

Multiplying Complex Numbers

Multiplying complex conjugate factors:

Sum of squares identity: $A^2 + B^2 = (A + Bi)(A - Bi)$

When multiplying: $(x - a - bi)(x - a + bi) = x^2 - 2ax + (a^2 + b^2)$

Remember: $i^2 = -1$

Ex. Simplify

1. $(5i)(2i)$
2. $(3 - 2i)(-4 + i)$
3. $(x - 2 - i)(x - 2 + i)$

Factor over the complex numbers (see pg. 24-25)

Use the quadratic formula to find the zeros, then write the zeros as factors.